IBM System Storage DS3950 Express

Manage growth, complexity and risk with scalable, high-performance storage

Highlights

- Simplify storage infrastructure with 8 Gbps Fibre Channel interfaces
- Leverage mixed-host interfaces support (Fibre Channel and iSCSI) for storage area network (SAN) tiering
- Gain balanced performance well-suited for virtualization and consolidation
- Support for intermixing Fibre Channel, SATA and FC-SAS drives enabling cost-effective tiered storage
- Support up to 112 disk drive modules using up to six IBM® System Storage® EXP395 expansion units

Optimized data management requires storage solutions with high data availability, strong storage management capabilities and powerful performance features. IBM System Storage DS3950 Express is designed to provide lower total cost of ownership, high performance, robust functionality and unparalleled ease of use. As part of the IBM DS series, DS3950 Express offers:

- High-performance 8 Gbps Fibre Channel connections
- The option of a 1 Gbps iSCSI interface in Model 98H
- Up to 224 TB of raw physical capacity using 112 SATA 3.5-inch (2 TB) disk drives
- Powerful system management, data management and data protection features

Achieve a lower total cost of ownership

Facing relentless data growth and shrinking budgets, companies continue to look for ways to reduce costs through efficiencies. The advent of 8 Gbps Fibre Channel allows companies to reduce the number of host bus adapters (HBAs) per server and the number of overall ports in their Fibre Channel SAN infrastructure without sacrificing performance, thus saving on both acquisition and operational costs.

Additionally, the DS3950 auto-negotiating 8 Gbps Fibre Channel interfaces allow for seamless integration into an existing 2 Gbps or 4 Gbps infrastructure, while providing organizations with investment protection going forward when the SAN standard increases to 8 Gbps.

The design of DS3950 avoids over-configuration for an affordable, entry-point price, while also offering seamless pay-as-you-grow scalability as requirements change. Its efficient storage utilization lowers raw capacity requirements, and its support for intermixing high-performance and high-capacity drives enables enclosure-based tiered storage. These unique capabilities reduce the number of drives needed to meet performance and capacity demands—resulting in lower acquisition and operational expenditures.

Establish high data availability

Now you can develop storage environments that can deliver unprecedented data availability using DS3950 Express. Offering a choice of multiple RAID levels and redundant hot-swappable components, the disk storage system can help you maintain data availability and security.

Your data center can also enhance resiliency with IBM disk storage systems. Powerful dynamic capabilities go beyond traditional backup and recovery methods to help protect data and prevent failures. In addition, you gain the benefits of enterprise-class disaster-recovery strategies and point-in-time copying with IBM FlashCopy® solutions.

The IBM System Storage DS series allows flexible access to data that can enhance information insights. The series also provides a broader range of scale and performance options to

provide structure and context to information. As a result, you can build data management strategies that align with your information requirements. DS3950 can help accommodate the changing value of data over time while maintaining data availability.

The DS3950 storage system offers redundant components, automated I/O path failover, and extensive online configuration, reconfiguration and maintenance capabilities to help ensure your data is available 24x7. DS3950 is designed to protect stored data as well. DACstore technology stores configuration metadata on each drive; Proactive Drive Health Monitoring (PDHM) technology identifies faulty drives before they create problems; RAID 6 technology helps guard against concurrent drive failures and errors; and persistent cache backup is designed to ensure any data in cache is captured and safe in the event of a power outage. All of these features combine to create a system you can trust with your data.

Increase performance

DS3950 offers high-performance storage to help manage compute-intensive workloads. It is a good fit for both transaction-oriented and bandwidth-intensive applications. DS3950 is also an ideal choice for environments with intense replication requirements, because it can efficiently handle the additional performance demands of FlashCopy, VolumeCopy and Enhanced Remote Mirroring.

DS3950 Express systems have four independent 8 Gbps Fibre Channel host ports for direct attachment to servers or fabric attachment to SANs. As one of the first enterprise-class storage systems based on 8 Gbps Fibre Channel technologies, DS3950 can help you prepare for the future while making the most of your current infrastructure. It provides auto-negotiate Fibre Channel connection speeds, allowing integration into an existing 2 Gbps or 4 Gbps infrastructure. The storage system can also deliver performance and connectivity improvements, while helping you prepare for the inevitable arrival of the SAN 8 Gbps standard.

The four 4 Gbps drive connections support up to 112 disk drives using up to six attached EXP395 disk enclosures. DS3950 Express is designed to support up to 100.8 TB of high-performance physical storage capacity using 900 GB FC-SAS 2.5-inch disk drives. DS3950 is available with up to 4 GB of physical cache memory (2 GB per controller).

DS3950 runs the same robust yet intuitive storage management software as previous storage systems in the series. It is designed to allow maximum utilization of storage capacity and complete control over a rapidly growing storage environment.

In the same way organizations have benefited from tiered storage (using high-performance Fibre Channel drives for primary storage and low-cost SATA drives for secondary storage), they can now benefit from tiered SANs. IBM DS series storage systems offer high-performance, highly reliable Fibre Channel interfaces for production servers, and low-cost iSCSI interfaces for secondary servers (model 98H). This combination allows organizations to implement a single storage system to support all their shared storage requirements—maximizing productivity, reliability and investment protection.

Serve a wide range of storage consolidation and clustering applications

DS3950 is an affordable, scalable system for storage consolidation and clustering applications. Its modular architecture, which includes dynamic capacity addition and dynamic volume expansion capabilities, enables storage capacity to grow as demands increase. Autonomic features, such as online firmware upgrades and DS Remote Support Manager, also help enhance the system's usability.

DS3950 can help consolidate direct-attached storage into a centrally managed, shared or SAN environment. With built-in support for eight Fibre Channel-attached servers, the need for additional switches is reduced or eliminated, helping to make server clustering more cost effective.

You can easily expand your storage solution with the IBM System Storage EXP395 storage expansion unit, offering a 16-bay disk enclosure. Achieve up to 14.4 TB physical capacity per expansion unit using sixteen 900 GB FC-SAS disk drives, or up to 32 TB physical capacity per expansion unit using sixteen 2 TB SATA disk drives.

EXP395 drive enclosure (1814-92H)

The EXP395 drive enclosure (model 1814-92H) is more than "just a bunch of disks." The enclosure is designed to optimize performance, availability and serviceability. It features:

- 4 Gbps Fibre Channel interfaces for high-speed connectivity
- Up to 16 Fibre Channel, SAS or SATA disk drives
- An enclosure services manager (ESM)-embedded loop switch
- Redundant 4 Gbps Fibre Channel drive loops, which help ensure availability in the event of a loop or cable failure
- Redundant power supplies, cooling fans and ESMs

All primary components are hot-swappable customer-replaceable units (CRUs) that can be easily accessed and removed or replaced.

Intermix capabilities

DS3950 Express supports intermixing of Fibre Channel, FC-SAS and SATA disk drives within the controller. It also supports attachment of EXP395 and legacy EXP810 enclosures to further enhance storage utilization.

Scalability throughout the DS3950

Because DS3950 Express is designed to be highly scalable with up to 112 Fibre Channel, FC-SAS or SATA disk drives, it can be upgraded from a workgroup SAN to an enterprise network storage system to grow with your business. In addition, with IBM System Storage DS® Storage Manager software, you can combine multiple DS3950 Express systems to help address additional performance and capacity requirements.

Dynamic capacity expansion (DCE) enables you to add EXP395 enclosures to an existing DS3950 Express without stopping operations. This can help you bring unused storage online for a new host group or an existing volume to provide additional capacity on demand.

DS3950 Express supports online controller firmware upgrades to help provide better performance and functionality. Events such as upgrades to support the latest version of DS Storage Manager or to add optional services such as DS Remote Support Manager can often be executed without stopping operations.

Centralize administration through DS Storage Manager software

The DS Storage Manager software included with DS3950 Express supports the centralized management of local and networked DS3950 systems. The software allows you to customize and change settings, configure new volumes, define mappings, handle routine maintenance, and dynamically add new enclosures and capacity to existing volumes—all without interrupting user access to data. Failover drivers, performance-tuning routines and cluster support are also standard features of DS Storage Manager. In short, this software helps reduce the complexity of storage management and the amount of time spent managing storage.

Enhance storage management capabilities

Using the DS Storage Manager software, administrators can partition DS3950 Express into as many as 128 virtual servers. Your IT organization can strategically allocate storage capacity to achieve high utilization of storage space and help reduce hardware and storage management costs. Instead of purchasing multiple RAID controllers with their own dedicated disks and management, you can attach multiple servers to one central system—DS3950 Express—which provides hardware failover with dual controllers and common management.

Other DS3950 Express features that can help enhance data management and protection include:

- FlashCopy, which enables point-in-time copies of logical volumes that may be used for file restoration, backups, application testing or data mining
- Dynamic volume expansion, which allows administrators to resize logical volumes without disrupting users
- VolumeCopy, which provides full replication of one logical volume (source) to another (target) within DS3950
- Enhanced Remote Mirror, which consists of Global Mirror with Asynchronous Write-order Consistency (a critical feature for mirroring multi-logical unit number [LUN] applications), Global Copy with Asynchronous and Metro Mirror with Synchronous capabilities

DS3950 Express uses a common pool of hot-spare disk drives as a cost-effective way to help improve availability. IT administrators can determine the number of drives to allocate as spares.

Additional tools to help manage storage

DS3950 is supported by a variety of IBM Tivoli® software products. IBM Tivoli Storage Manager, IBM Tivoli Storage Resource Manager and many third-party hardware and software products can add to the capabilities of DS3950 by enabling backup and storage reporting.

Service, support, and financing

DS3950 Express comes with a three-year, 9x5, next-business-day hardware and software warranty. Additional services for hardware installation, DS Storage Manager configuration and advanced storage management are also available from IBM Global Services. IBM Support Line services can assist you with using DS Storage Manager to enable self-maintenance for the DS3950 system.

The optional IBM Remote Support Manager for Storage enables DS3950 to quickly notify the IBM Support Center when the system detects a problem. This notification can help reduce or eliminate the need for a service call. To help expedite diagnosis and repair of failed hardware and software, error alert messages from DS Storage Manager can be forwarded through email.

IBM System Storage DS3950 Express at a glance	
Characteristics	
Model	1814-94H and 1814-98H
RAID controller	Dual active
Cache	Model 94H: 2 GB Model 98H: 4 GB Battery-backed
Host interface	Model 94H: Four 8 Gbps Fibre Channel Model 98H: Four 8 Gbps Fibre Channel and four 1 Gbps iSCSI
Drive interface	4 drive ports—Fibre Channel Switched and Fibre Channel Arbitrated Loop (FC-AL) standard, auto-sensing 2 Gbps/4 Gbps
Supported drives	4 Gbps Fibre Channel: 300 GB, 450 GB and 600 GB 15k rpm 4 Gbps SATA: 1 TB and 2 TB 7.2k rpm 6 Gbps FC-SAS (2.5-inch): 300 GB, 600 GB and 900 GB 10k rpm
RAID levels	0, 1, 3, 5, 6, 10
Storage partitions	4, 8, 16, 64 or 128
Maximum drives supported	112 Fibre Channel, FC-SAS or SATA drives (using 6 EXP395 expansion units)
Fans and power supplies	Dual redundant, hot-swappable
Rack support	19-inch, industry-standard rack
Management software	IBM System Storage DS Storage Manager version 10.xx
SAN support	IBM Fibre Channel switches and directors (product numbers 2005, 2006, 2109, 2026, 2027, 2031, 2032, 2034, 2042, 2054, 2061 and 2062, and IBM BladeCenter®)
Warranty	Three-year parts and labor warranty, 9×5 next business day, upgradeable to 24×7 with four-hour response
Physical characteristics	
Dimensions	H - 130.3 mm (5.13 in.) W - 447.0 mm (17.6 in.) D - 563.8 mm (22.2 in.)
Supported systems	For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the DS3950 Express Interoperability Matrix. DS3950 Express is supported only in rack installations. With optional features, up to six EXP395 expansion units can be attached to DS3950 Express allowing up to a maximum of 112 drives.

Model	Model description	Interface	Model includes
1814-92H	Drive enclosure	4 Gbps Fibre Channel interface	ESM-embedded

EXP395 Drive Enclosure	
Relative humidity (no condensation)	**EXP395 Drive Enclosure**
Operating range	8% – 80%
Storage range	5% – 80%
Maximum dew point	26°C (79°F)
Maximum gradient	10% per hour
Altitude ranges	**EXP395 Drive Enclosure**
Operating	30.5 m (100 ft) below sea level to 3,000 m (9,842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3,000 m (9,842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level
Heat dissipation	**EXP395 Drive Enclosure**
BTU/hr.	1,516
KVA	0.462
Watts (AC)	600
Amps (240 V ac)	2.25
The tabulated power and heat dissipation values are the maximum measured operating power.	
Acoustic noise	**EXP395 Drive Enclosure**
Sound power	6.5 bels
Sound pressure	67.5 dBA
Power input	**EXP395 Drive Enclosure**
Nominal voltage range	100 – 240 V ac
Frequency range	50 – 60 Hz
Max operating current	5.4 A at 100 V ac 2.25 A at 240 V ac

For more information

To learn more about IBM System Storage DS3950 Express, please contact your IBM representative or IBM Business Partner, or visit:

- **ibm.com**/systems/storage/disk/ds3950
- **ibm.com**/systems/express/storage

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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

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